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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,217	03/08/2004	Abhinav Gupta	50277-2328	2706

			EXAMINER
29989	7590	10/16/2006	STEVENS, ROBERT

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ART UNIT	PAPER NUMBER
2162	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/796,217	GUPTA ET AL.
	Examiner	Art Unit	
	Robert Stevens	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>08 March 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-39_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-39_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>2/18/05, 3/18/05, 1/18/06</u>.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

Claim Objections

1.   **Claim 13** is objected to because of the following informalities: Claim 13 appears

to contain a grammatical error in line 1 ("first set of data *is includes*"). Appropriate

correction is required.

Claim Rejections - 35 USC § 101

2.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
> matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
> conditions and requirements of this title.

3.   **Claims 1-39 are rejected under 35 U.S.C. 101** because the claimed invention is

directed to non-statutory subject matter.

To be statutory, a claimed computer-related process must either: (A) result in a

physical transformation outside the computer for which a practical application is either

disclosed in the specification or would have been known to a skilled artisan, or (B) be

limited to a practical application with useful, concrete and tangible result.

Regarding independent claims 1 and 17: These claims are directed to the formulation of a data set, but do not necessarily bring the data into existence in a form which enables any usefulness of having generated the data to be realized. In both instances, the claimed steps appear to be pure mathematical manipulations rather than a practical application of those manipulations with a tangible result that enables any usefulness of the results to be realized.

Claims 1 and 17, and other claims that depend on them, are not patent eligible because the invention recited therein does not produce a useful, concrete and tangible result.

Further regarding claims 19-36: In the preamble, these claims recite a machine-readable medium. Such a medium encompasses transmission media, for example, as stated on page 47 in paragraph [0105] of the as-filed specification. Current Office policy is that transmission media, such as a wires or fiber optics, is not considered a tangible embodiment of data. I.e., a wire does not "store" data. It merely provides a conduit for transporting data from one storage component to another. One way to correct the claim language is to recite the storage of the claimed subject matter on a tangible medium, as reflected in the as-filed specification.

Further regarding claims 37-39: These claims are directed to a system for

implementing the nonstatutory claims 1 and 17-18. As such, these claims encompass a

machine for carrying out a mathematical algorithm (i.e., performing a join, or union,

logical mathematical operation), and thus reflect non-statutory subject matter.

Claim Rejections - 35 USC § 112

4.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

5.   **Claims 17-18 and 35-39 are rejected under 35 U.S.C. 112, second**

paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter which applicant regards as the invention.

Regarding claims 17 and 18: These claims recite the negative limitation (claim

17 at line 5, claim 18 at line 2) "wherein the generating is performed <u>without</u> performing

... ". [Emphasis added.] The claim meaning and scope are unclear.

Claims 18, 35-36 and 38-39 are dependent upon claim 17 (and claim 18, as

appropriate), and therefore likewise rejected.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7.   **Claims 1-2, 4-5 and 16-18 are rejected under 35 U.S.C. 102(b)** as being

anticipated by Rogers (US Patent No. 6,397,214, filed Nov. 3, 1998 and issued May 28,

2002, hereafter referred to as "Rogers").

Regarding independent claim 1: Rogers discloses *A machine-implemented*

method comprising the steps of: generating, based on a first set of data

associated with a plurality of dimensions, a second set of data that is denser than

the first set of data relative to a first dimension of the plurality of dimensions;

(See Rogers noting the transition from Figure 1A to Figure 1D, in context of the

Abstract, disclosing the creation of a second data set, 1D, that is denser than a first data

set, left table of 1A.) *wherein the first set of data includes a plurality of subsets of*

data; (See Rogers Figure 1A, left table, comprised of several records.) *and wherein*

the step of generating includes performing an outer join between each of the

subsets of data and a third set of data. (See Rogers Figure 1D in the context of

column 2 lines 51-52, disclosing a Full outer join performed using the left [1st data set]

and right [2nd data set] tables of Figure 1A.)

Regarding claim 2: Rogers teaches *wherein the first set of data includes rows that are associated with dimension value combinations in which the dimension value combinations are combinations of dimension values selected from the plurality of dimensions,* (See Rogers Figure 1A, noting "Department" and "Name" dimensions of the left table.) *wherein the second set of data includes corresponding rows for the dimension value combinations that correspond to the rows of the first set of data,* (See Rogers Figure 1A, noting the "Name" dimension of the right table.) *wherein the corresponding rows are associated with the dimension value combinations,* (See Rogers Figure 1A, noting the "Name" dimension of the left and right tables.) *and wherein the step of generating comprises the steps of checking if a corresponding row exists in the second set of data for a set of dimension value combinations, wherein the set of dimension value combinations is dense with respect to one dimension;* (See Rogers Figure 1D, noting combinations are dense with respect to the "Name" dimension.) *and creating the row if the corresponding row does not exist.* (See Rogers Figure 1D, noting the creation of Accounting/John Smith/1533 record [i.e., row], for example.)

Regarding claim 4: Rogers teaches *wherein each of the subsets of data is a single row of data.* (See Rogers Figure 1A, left table.)

Regarding claim 5: Rogers teaches *wherein each of the subsets of data is a partition of the first set data, and is associated with a single dimension value selected from one dimension of the plurality of dimensions.* (See Rogers Figure 1A, left table and noting that each row has a unique "Name" dimension value.)

Regarding claim 16: Rogers teaches *wherein the first set of data is associated with a plurality of dimensions, the second set is associated with the plurality of dimensions, and the second set of data is denser with respect to one of the plurality of dimensions.* (See Rogers Figures 1A and 1D, noting that 1D is denser than 1A.)

Regarding independent claim 17: Rogers discloses *A machine-implemented method comprising: generating, based on a first set of data associated with a plurality of dimensions, a second set of data that is denser than the first set of data relative to a first dimension of the plurality of dimensions;* (See Rogers noting the transition from Figure 1A to Figure 1D, in context of the Abstract, disclosing the creation of a second data set, 1D, that is denser than a first data set, left table of 1A.) *wherein the generating is performed without performing a combination of a sort of the first set of data for distinct values of a second dimension of the plurality of dimensions, generating a first set of rows by performing a cross product of the distinct values found and a set of dimension values of the first dimension, and adding to said first set of rows, rows corresponding to dimension values of the*

set of the dimension values for which no row exists in the first set of rows. (See

Rogers Figure 1D in the context of column 2 lines 51-52, disclosing a Full outer join

performed using the left [1st data set] and right [2nd data set] tables of Figure 1A, without

performing the actions listed.)

Regarding claim 18: Rogers teaches *wherein the generating is performed*

without performing a sort of the first set of data in which the sort of the first set of

data is used to find distinct values of a second dimension of the plurality of

dimensions. (See Rogers Figure 1D in the context of column 2 lines 51-52, disclosing

a Full outer join performed using the left [1st data set] and right [2nd data set] tables of

Figure 1A, without performing the actions listed.)

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

9.   **Claims 3, 6-15 and 19-39 are rejected under 35 U.S.C. 103(a)** as being

unpatentable over Rogers (US Patent No. 6,397,214, filed Nov. 3, 1998 and issued May

28, 2002, hereafter referred to as "Rogers") in view of Graefe et al. (US Patent No.

6,298,342, filed Mar. 16, 1998 and issued Oct. 2, 2001, hereafter referred to as

"Graefe").

Regarding claim 3: Rogers does not explicitly teach this limitation. Graefe,

though, discloses *wherein the step of checking is performed within a set of nested*

loop instructions that perform one loop for each dimension value combination of

the set of dimension value combinations. (See Graefe column 7 lines 57-60,

discussing that nested loops use one of three basic methods for performing a JOIN

operation.)

It would have been obvious to one of ordinary skill in the art at the time of the

invention to apply the teachings of Graefe for the benefit of Rogers, because to do so

provided a programmer with an ANSI standard SQL mechanism for implementing an

outer join, as taught by Graefe in the Abstract. These references were all applicable to

the same field of endeavor, i.e., data base join operations.

Regarding claim 6: Rogers does not explicitly teach this limitation. Graefe,

though, discloses *wherein the step of generating is performed in response to*

detecting a data manipulation language statement. (See Graefe column 7 lines 2-

18, discussing the use of SQL in a JOIN operation.)

Regarding claim 7: Rogers does not explicitly teach this limitation. Graefe, though, discloses *wherein the step of generating includes performing the outer join on a first subset using a first processor and performing the outer join on a second subset using a second processor that is different than the first processor.* (See Graefe column 4 line 65 – column 5 line 8, discussing various hardware configurations.)

Regarding claim 8: Rogers teaches *wherein the outer join is a right outer join.* (See Rogers Figure 1B.)

Regarding claim 9: Rogers teaches *wherein the outer join is a right outer join.* (See Rogers Figure 1C.)

Regarding claim 10: Rogers does not explicitly teach this limitation. Graefe, though, discloses *wherein the step of generating is performed by an SQL engine.* (See Graefe column 7 lines 2-18, discussing the use of SQL in a JOIN operation.)

Regarding claim 11: Rogers does not explicitly teach this limitation. Graefe, though, discloses *wherein the step of generating includes receiving an expression that indicates a partitioning key for partitioning the first set of data.* (See Graefe column 7 lines 40-44, discussing the use of an employee name key.)

Regarding claim 12: Rogers does not explicitly teach this limitation. Graefe, though, discloses *wherein the outer join is associated with join conditions that includes a Boolean expression.* (See Graefe column 7 line 43, noting the equality condition for employee.dept_id and department.dept_id.)

Regarding claim 13: Rogers does not explicitly teach this limitation. Graefe, though, discloses *wherein said first set of data is includes a first set of rows; and wherein said outer join is between said first set of rows and a second set of rows, and the step of generating includes sending each of a plurality of processes a subset of said first set of rows and all of said second set of rows.* (See Graefe column 7 lines 36-44, discussing SQL processing code.)

Regarding claim 14: Rogers does not explicitly teach this limitation. Graefe, though, discloses *wherein the generating includes specifying at least one dimension of the plurality of dimensions,* (See Graefe column 7 line 43, noting the specification of an employee dimension.) *and hash partitioning the first set of data with respect to the dimension specified.* (See Graefe column 7 line 59, discussing the well-known hash-join operation.)

Regarding claim 15: Rogers does not explicitly teach this limitation. Graefe, though, discloses *detecting a construct that includes a condition limiting which dimension value combinations are included in the second set of data; and in response to detecting the other construct, performing the operation only with respect to the dimension value combinations to which the second set of data was limited.* (See Graefe column 7 lines 36-44, discussing SQL processing code.)

Claims 19-36 are substantially similar to claims 1-18, and therefore likewise rejected. It is noted that these claims also recite the use of one or more processors. Rogers does not explicitly teach the use of a particular hardware configuration. Graefe, though, discloses the use of processors (See Graefe column 4 line 65 – column 5 line 8, discussing various hardware configurations.)

Claims 37-39 are substantially similar to claims 1, 35 and 36, and therefore likewise rejected.

Conclusion

10.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

Non-patent Literature
Codd, E. F., et al., "Extending the Database Relational Model to Capture More Meaning", <u>ACM Transactions on Database Systems</u>, Vol. 4, No. 4, Dec. 1979, pp. 397-434.

US Patents

Chen et al	6,446,063
Shoupe et al	6,073,134
Lindsay et al	6,665,663
Raitto et al	5,991,754
DePrez	5,423,035

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Stevens whose telephone number is (571) 272-4102. The examiner can normally be reached on M-F 6:00 - 2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Robert Stevens
Examiner
Art Unit 2162

October 12, 2006

SHAHID ALAM
PRIMARY EXAMINER